



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005OR69B

Title: Groundwater and Surface Water Resources in the Williams Creek Watershed, Southern Oregon

Project Type: Research

Focus Categories: Education, Groundwater

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Congressional District: Oregon

Principal Investigator:
Charles Rogers

Abstract

Groundwater and Surface water are interdependent and rely on annual rainfall in the Williams Basin. Over appropriation of irrigation rights, expanding population, and the need for native salmonid and aquatic species, all compete for limited water resources. This study investigates the water potential and seeks to develop a groundwater/surface water flow model using GIS and MODFLOW. By monitoring existing wells to collect aquifer data, rainfall information derived from various locations, geologic mapping, and newly established gauging station, we seek to develop an overall picture of the groundwater.

Williams Creek is a major tributary to the Applegate River entering at river mile 19.5, and its tributaries drain 82 square miles (52,432 acres) of the Siskiyou Mountains Province. Major tributaries of Williams Creek include: the East Fork Williams Creek (11.60 square miles); the West Fork Williams Creek (19.47 square miles); Powell Creek (8.17 square miles); and the main stem of Williams Creek (42.76 square miles). Land use is predominately forestry, especially in the upland sections, with the lower fertile valley portion primarily agricultural with a slow increase in upscale homes and small rural ranches.

The Williams Creek Watershed is designated as a recovery zone for anadromous fish runs in Southern Oregon. Oregon Department of Fish and Wildlife (ODFW) and Oregon Water Resources Department (WRD) have identified Williams Creek as a high priority stream flow restoration area for salmonid growth and refugia in the Applegate River Watershed. This proposal includes several of the WRD's Oregon Plan measures specifically designed to enhance streamflow. Salmonid species, such as the fall Chinook, endangered Southern Oregon coho, winter Steelhead, and Pacific lamprey all use these waters for spawning and rearing. Southern Oregon native salmon runs and especially those in the Applegate River tributaries are threatened because of several factors; low flow, elevated summer temperatures, and excessive winter turbidity.

With the construction of the Applegate Dam in 1981 many miles of prime salmon spawning and rearing habitat above the dam was cut off from native runs. Irrigation push up dams and other diversions have contributed to the slow decline of the native runs in the region. Water quality has suffered from road construction, deforestation, and intensive agriculture. Water temperatures have been affected from factors including, clearing of land, erosion, flooding, and gravel exposure to summer sun. Gravel extraction has contributed to the removal of vital substrate that promotes spawning, riparian vegetation, complex channel characteristics, and reduced streambed elevations. Large Wood in stream systems which holds and filters surface water has been systematically removed, either by landowners and loggers attempting to improve the flow characteristics or by large flood events that remove wood debris and gravel.

The Williams Valley has shown to have valuable habitat, year around flow, adequate temperatures, intact forests, and interested landowners in improving the viability of this and other native species within the watershed. Recovery of these native fish runs is dependent on stream flow and, of course, habitat improvements. The ultimate challenge we face is to balance the need for water within this basin with irrigators, landowners, and native fish to promote a local climate that supports existing lifestyles and exemplifies the Oregon Plan for Salmon Recovery. Continued data collection from established gauging station, well networks, temperature probes, rainfall, and local water users will provide us with a system that uses our existing resources and provides education opportunities to local geology and hydrology students.